

Attorney Docket No.: 0140111

RECEIVED
CENTRAL FAX CENTER
OCT 11 2006REMARKS

Prior to the present amendment and response, claims 1, 3-7, 9-16, and 18-20 were pending in the present application. By the present amendment, claims 1, 9, and 16 have been amended and claims 7, 15, and 20 have been canceled. Thus, after the present amendment, claims 1, 3-6, 9-14, 16, 18, and 19 remain in the present application. Reconsideration and allowance of outstanding claims 1, 3-6, 9-14, 16, 18, and 19 in view of the above amendments and the following remarks are respectfully requested.

A. Rejections of Claims 1, 3-7, 9-16, and 18-20 under 35 USC §102(e)

The Examiner has rejected claims 1, 3-7, 9-16, and 18-20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Number 6,521,997 to Huang et al. (Hereinafter "Huang"). For the reasons discussed below, Applicants respectfully submit that the present invention, as defined by amended independent claims 1, 9, and 16, is patentably distinguishable over Huang.

As disclosed, the present invention includes a surface mount component (also referred to as "SMC") having first and second terminals, which is situated over a substrate in an MCM (i.e. a multi-chip module or a multi-component module). First and second pads are situated on the substrate and are coupled to the first and second terminals, respectively. As part of the solution to the shortcomings of the conventional technology, solder mask trench 124 is formed under a surface mount component, such as SMC 102 or SMC 302, although the region under the SMC is not generally solderable and wherein, in

Attorney Docket No.: 0140111

any event, no soldering is to take place. Thus, solder mask trench 124 is formed where, in the absence of the present invention, no solder mask opening would be formed. Indeed, since the invention does not require complex changes to the existing technology, the disadvantages of the existing technology in having voids in molding compounds under an SMC are overcome without increasing manufacturing costs. Thus, as a part of the teachings of the present invention, a solder mask trench is formed under the SMC, and the trench thus formed and the resulting moldable gap are filled with a molding compound.

More particularly, as shown in, for example, Figure 1 of the present application, solder mask trench 124 is formed within, i.e. between portions of, solder mask 112. By forming solder mask trench 124 underneath the surface mount component and within solder mask 112, moldable gap 125, with an increased height 128, is advantageously formed and is substantially larger than a conventional moldable gap. By contrast, in a conventional structure, solder mask 112 would fill the region between pads 106 and 108 underneath the surface mount component. As a result, a conventional moldable gap that would be formed between solder mask 112 and the bottom surface of the surface mount component would have a reduced height 130, as shown in Figure 1 of the present application.

Thus, by forming solder mask 124 within, i.e. between portions of, solder mask 112, embodiments according to the present invention advantageously achieve a significantly larger moldable gap, having height 128, that improves molding compound flow underneath the surface mount component and, consequently, minimizes void

Attorney Docket No.: 0140111

formation underneath the surface mount component. As a result, embodiments according to the present invention advantageously minimize the risk of shorting between the terminals of the surface mount component during, for example, reflow assembly. Thus, among other advantages, the reliability of the surface mount component is significantly increased.

In contrast, the disclosure in Huang is limited to a “chip-carrier mounted with a passive component,” where the chip carrier “is a substrate for use in a BGA (ball grid array) semiconductor package.” Huang, column 4, lines 3-4 and lines 7-8. The ball grid array package disclosed by Huang, however, is not analogous to the MCM of the present invention. A ball grid array package is utilized prior to integrating various packages (such as a BGA package) and/or various surface mount components and devices on a laminate printed circuit board situated in the MCM of the present invention. As disclosed in the present application, “a discrete or active packaged device,” such as Huang’s ball grid array semiconductor package, is indented to be mounted onto and supported by a laminate printed circuit board situated in the MCM of the present invention. Present application, page 10, line 8. Therefore, to further distinguish the present invention from Huang, independent claims 1, 9, and 16 have been amended and now recite: “wherein said solder mask trench is filled with said molding compound, and wherein said overmolded module is an MCM.” Thus, since Huang is directed to a discrete semiconductor packaging technology and not to an MCM technology utilizing a laminate

Attorney Docket No.: 0140111

printed circuit board, the present invention is not taught, disclosed, or suggested by Huang.

RECEIVED
CENTRAL FAX CENTER
OCT 11 2006

For the foregoing reasons, Applicants respectfully submit that the present invention as defined by amended independent claims 1, 9, and 16 is not taught, disclosed, or suggested by the art of record. As such, the claims depending from amended independent claims 1, 9, and 16 are, *a fortiori*, also patentable for at least the reasons presented above and also for additional limitations contained in each dependent claim.

B. Conclusion

Based on the foregoing reasons, the present invention, as defined by amended independent claims 1, 9, and 16, and the claims depending therefrom, is patentably distinguishable over the cited art. Thus, outstanding claims 1, 3-6, 9-14, 16, 18, and 19 are patentably distinguishable over the cited art. As such, and for all the foregoing reasons, an early Notice of Allowance directed to all claims 1, 3-6, 9-14, 16, 18, and 19 remaining in the present application is respectfully requested.

Attorney Docket No.: 0140111

Respectfully Submitted,
FARJAMI & FARJAMI LLP

Date: 10/11/06



Michael Farjami, Esq.
Reg. No. 38, 135

FARJAMI & FARJAMI LLP
26522 La Alameda Ave., Suite 360
Mission Viejo, California 92691
Telephone: (949) 282-1000
Facsimile: (949) 282-1002

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being filed by facsimile transmission to United States Patent and Trademark Office at facsimile number 571-273-8300 on the date stated below. The facsimile transmission report indicated that the facsimile transmission was successful.

Date of Facsimile: 10/11/06

Christina Carter
Name of Person Performing Facsimile Transmission

Christina Carter 10/11/06
Signature Date

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Date of Deposit: _____

Name of Person Mailing Paper and/or Fee

Signature Date